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J.C.

APIARIAN'S GUIDE,

from E. Hoagland
Sunee, N.Y.

BEING

A PRACTICAL TREATISE

ON THE

CULTURE AND MANAGEMENT OF

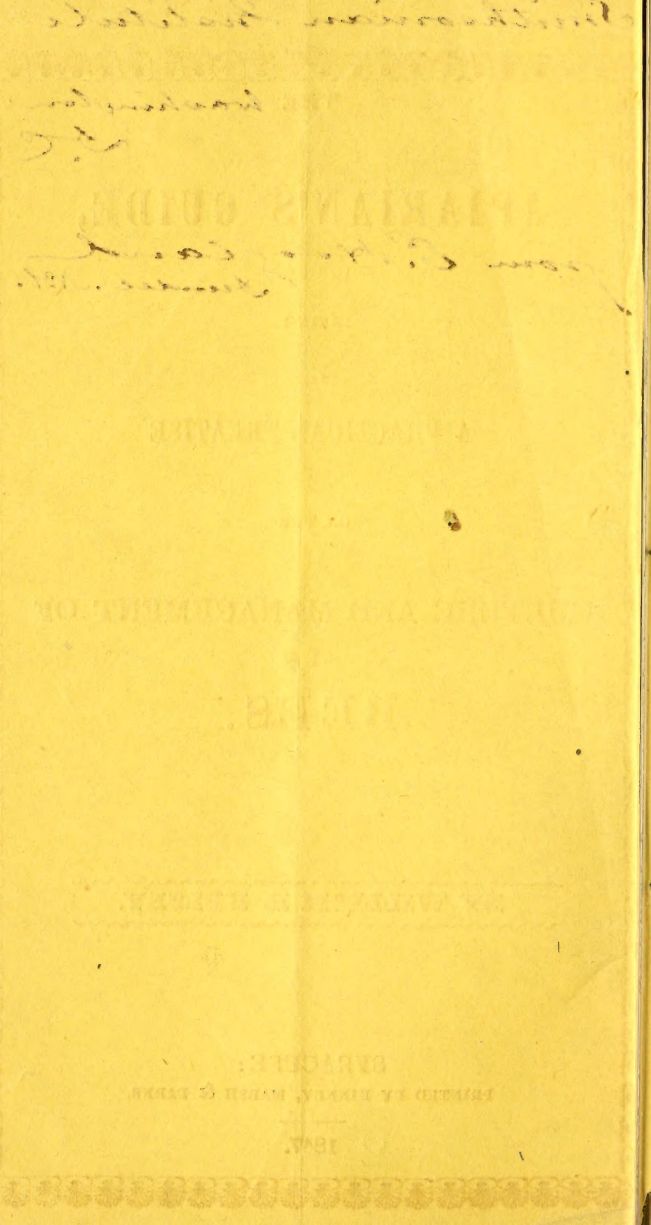
B E E S.

BY WILLIAM R. KELSEY.

SYRACUSE:

PRINTED BY KINNEY, MARSH & BARNES.

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APPLIANT'S GUIDE

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Entered according to Act of Congress, in the Office of the Clerk of the
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BEE.

BY WILLIAM E. KELSEY.

SYRACUSE:

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TREATISE

ON THE

CULTURE AND MANAGEMENT OF

B E E S .

“No branch, perhaps, of agricultural, or rather rural occupation, has been so much neglected in this country as *bee culture*. Wherever it has been attempted with care it has always proved profitable; but many who engage in this business, abandon it,—for the reason that the bee is left to be its own protector against its many enemies, but more particularly against its common enemy the bee moth.”—*Report of H. L. Ellsworth, Commissioner of Patents, 1844*.—p. 313.

That the above remarks are true no person who of late years has had any experience in the management of bees can deny; and while many and constant experiments have been made by apiarians to overcome the natural obstacles to their success, it is somewhat surprising that an efficient and certain remedy for their difficulties was not sooner discovered and brought into general use.

Although the number of bee culturists in the United States at the present time far exceeds that of any former period, and notwithstanding the number of persons ordinarily considered as keen observers in all common business affairs whereby “a penny may be earned or gained,” one cannot be less surprised, nor but regret that more attention has not been paid to the economy of bees—the dangers to which they are subjected, and the causes of the apparent anomalies which are so frequently exhibited in their ordinary management.

Even at the present day when some fifty or sixty volumes have been written upon the subject of bees, and frequent communications from practical apiarians have been widely diffused by means of the highly interesting and valuable agricultural journals published in the different parts of the Union, and a mass of light and instruction has been shed abroad upon the subject, there are almost as many opinions among the mass of bee culturists in regard to the best modes of rearing and managing them, and also as to the sex, offices and functions of the different members of the respective bee communities as there has been authors upon the subject. But in the main, one writer has generally followed the *assertions* of a preceding one, and the mass of true and useful information that has been published is so mixed up with error, and the results of *pretended observation*, as to be of little or no benefit to the mass of readers, who take assertions for facts without reflection,—even were it easy to distinguish and sift out that which is *reliable* from that which is *theory*.)

As I have neither the time nor the desire to “play the Author,” I shall briefly state some few facts in regard to the subject, trusting that they will be received by apiarians, rather as MEMORANDA, than as a distinct and orderly Treatise.

Although I shall not attempt to confine myself to the theories or vagaries of any particular author, it would be ungenerous in me to refrain from acknowledging my indebtedness to the work published in England by Edward Bevan, Esq., from which I shall make a few quotations where I deem it advisable; not because of the originality or novelty of his ideas, but of the conciseness and perspicuity of the language. The work referred to, like most others on the subject, although containing much important matter, is so lumbered up with the ideas, writings and quotations of others, and contains so many opinions of distinguished “scientific” men, as to be of comparatively little use for *practical* purposes.

Without further preface therefore, I shall first briefly notice the different classes of bees to be found forming ordinary swarms. Every association of bees comprises three descriptions or classes, each distinct, and of peculiar character, viz:

1st. The Queen, who is the mother and mistress of the hive. She is distinguished from the rest by the great length

of her body, the proportional shortness of her wings and her curved sting. Her body tapers gradually to a point, her underjaws are shorter, her head rounder and her trunk more slender than that of the working bee. Her wings extend only half the length of her body, and her legs, though longer, have neither brushes nor baskets. Her upper surface is of a bright black, and her under surface and legs of a dark brown or copper color; the hinder legs being somewhat darker than the rest.

2d. The working bees. These are by some called *neuters* or *mules*, and by others *female non-breeders*, or females with undeveloped ovaries. In ordinary swarms these number from 10,000 to 20,000. They are the smallest members of the community, are furnished with long flexible probosces, have a peculiar structure of the legs and thighs, on the latter of which are small hollow baskets to receive the farina and gatherings, and are armed with straight stings. Upon this class devolves all the labor; they rear the young, guard the entrances, elaborate the wax, collect and store the provisions and build the cells.

3d. The Drones or Males, numbering about one-tenth of the whole population. They make their appearance about the first of May and are not very often seen after the breeding season is over, or middle of August. They are one-third larger than the working bees, thicker, and of a darker color. They have shorter jaws as well as shorter probosces, and are more blunt at the tail than either the queen or workers; the last ring of the body is fringed with hairs extending over the tail, and visible to the naked eye. They make a greater noise in flying, are destitute of baskets on their thighs, and have no stings; are rather shorter than the queen, but generally much larger. Comparatively, they seldom come out of the hive. From this description it is readily discovered that they are idle, cowardly and inactive, and we must therefore infer that the only way in which they render themselves useful or promote the welfare of the hive, is a sexual one.

Besides these three essential classes, about the commencement of the swarming season a few bees may occasionally be seen which present a somewhat singular appearance. They have small light colored top-knots on the centre of their front-

lets, which very much resemble short antennæ rising from single roots. In all other respects they resemble the working bees, and appear to take part in the general business of the hive.

The queen deposits her eggs in cells prepared and constructed for their reception by the working bees. These cells vary in size, form, and direction, according to the class of bees which is intended to be developed in them. These eggs are deposited separately in such portion of the comb, *and in cells opposite to each other*, as may have been reserved, for the time being, for brooding comb. When a considerable number are deposited, they are usually about equally divided on each side of the brooding comb directly opposite to each other.

The eggs of bees are stated by Bevan and other apiarians to be about the size of butterfly eggs upon cabbage leaves,—of a lengthened oval shape slightly curved and of a bluish white color; they are composed of a thin membrane filled with a whitish liquor, and being besmeared at the time of deposit with a glutinous substance adhere to the bases of the cell, where in the progress of development in four or five days they look like small white worms, and float in a whitish transparent fluid which is deposited in their cells by the nursing bees.—These attend to the young bees during the whole time that they remain in the cells and until ‘hatched out.’ It is the opinion of many eminent naturalists that farina does not constitute the sole food of the bee larvæ, but that it consists of a mixture of farina with a certain proportion of honey and water partly digested by the nursing bee, in relative proportions varying according to the age of the young.

Leaving for others to explain the exact length of time that elapses between the different changes that the larvae undergo until fully developed as young bees, and the various minutiae attendant thereupon, as well as the many interesting, but for practical apiarians, comparatively unimportant anomalies that are exhibited by observations of the different classes before maturity, I will simply remark that very little that can be relied upon in regard to the subject is known from *recent reliable observations*. These explanations as published, have principally been handed down from one writer to another for several generations or centuries, with no change except a greater mi-

nuteness in description perhaps, than the preceding one had ventured to give, although every writer quotes his previous author, very little is claimed as the result of his own observation or even on "good authority."

(The usual period required for the developement of young swarms from the egg to the bee state, I have found to be from eight to twenty days, dependent in a measure upon the atmosphere; and swarms, the products of young swarms are frequently produced, emerge, and are hived, during the heat of summer in fourteen days from the time that their parent swarms were hived.)

As soon as the young insect has been cleaned from the exuvia and regaled with a little honey by the attendant bees, the latter clean out the cell thoroughly, preparatory to its being occupied by a new tenant or with honey. If a new brood is to be deposited in the same cells, they are all completely coated or lined with a new covering of wax, and this is repeated as often as they may be used for breeding young bees. Experience and observation has clearly proven the fact that after the young bees have emerged, every particle of the "bee bread" and exuvia in the cells and all impurities of every description are always removed before honey is stored in them. That they again wax over the cells when young swarms are again deposited in them is evident from a slight examination of almost any piece of old honey comb. The cells when constructed have very thin walls; but old comb that has been bred in repeatedly has always very thick walls and the size of the cells is very much diminished.)

As to the origin of the queen bee we know but little. It has been stated by apiarian writers, and the fallacy is credited by many at the present time, that "bees when deprived of their queen have the power of selecting one or more worker eggs or grubs and converting them into queens" by administering to them, and feeding them with, "a royal jelly, or pungent food" which is prepared by the working bees exclusively for that purpose; and while some authors have pretended to describe the whole minutiae, and explain the principles whereby such a radical change can be effected, others have gone so far as to describe the taste of this "pungent food." But notwithstanding the names of the *purely scientific* men who have

adopted this *theory*, it has been fully discussed, and ably refuted by several equally distinguished *practical bee men*, and men of reason. The simple fact of an examination of the several classes in a hive, will be sufficient to satisfy even the most skeptical, of the absurdity of such a *theorem*. That merely by increasing the size and changing the direction of the cell, and feeding the larvae with "a more pungent food" should not only cause the sexual organs to become developed, but should alter the shape of her tongue, her jaws and her sting; deprive her of the power of secreting wax and obliterate the baskets which but for these changes would have been formed upon her thighs, as well as change her colors essentially,—is not only beyond the credulity of the least reflecting, but certainly contrary to every idea of reason. As well might we believe in the possibility and probability of converting a mule into a breeding mare merely by giving one a large stall and "more pungent food"!! or a thorn into a thistle.

The idea of making a queen out of a working bee although it has been handed down by authors for successive centuries was adopted by Huber the naturalist, but Linneus denied it any weight. The former being a comparatively recent writer upon the subject has been followed by Bevan and others without giving sufficient weight to the well known fact, that although Huber has been generally regarded as a man of "very vivid imagination" his eye sight was defective, and he was obliged to rely principally upon the report of his hired assistants for the information and statements that he chronicles as his own observations, very little reliance can be placed upon his statements concerning matters requiring such nice and assiduous observation.

It has been remarked by entomologists, and from conversations that I have had with several candid practical bee culturists, whose observations and experience as they assured me confirmed the idea, I am inclined to believe, that working bees have been known occasionally to lay eggs; but it is also a remarkable fact that these fertile workers never lay any but drone eggs. The causes or philosophy of such occurrences I do not attempt to explain,—merely noticing the suggestion as it has been advanced to me. It is said that fertile workers are smaller in the belly and more slender than sterile workers, and that this is the only discoverable difference between them.

It is now uniformly admitted and observation convinces me of the fact, that intercourse between the queen and the drones takes place only on the wing;—that impregnation always place in the open air. However, in making this statement I do not wish totally to deny the *possibility* of intercourse elsewhere, for I am assured by James Roberts, Esq., of Reading, Steuben Co., N. Y., that he has witnessed it under a tumbler where he had succeeded in placing a queen and several drones. Nearly all winged insects have bodily interchange only on the wing. The flight of the queen is always preceded by that of the drones. It has been denied that the queen ever leaves the hive except at the period of swarming; I have frequently witnessed her visits to the open air, as has almost every other man who has had experience in the bee culture. Her journeys seldom exceed an hour in duration, and when she returns is always much larger than when she went out. There is good cause for believing that the intercourse is of itself usually fatal to the drones. That impregnation takes place in the air and on the wing, has been proven repeatedly by clipping the wings of the queen bee, who has never been known to deposit more than one swarm in the cells afterwards. How long a time elapses between the periods of impregnation and the deposit of eggs has never been satisfactorily determined. The deposit generally takes place immediately after a sufficient piece of comb is made, and without any particular reference to the number of days between the deposits of the one kind or the other, that I have been able to discover, although there are many theories and assertions afloat among bee men in regard thereto.

As is well known, the cells are of three kinds, viz: those for the production of workers, those for drones, and royal cells.—Those for drones are larger, wider and deeper than the ordinary working bees' cells, but different in no other respects; and all except royal cells are used for depositing honey when unoccupied or not required for young broods, indiscriminately; adjoining cells however being always used for similar purposes, in compact order. All common cells are built horizontally with the situation of the comb, are six sided or hexagonal in shape, and exhibit the clearest accuracy and workmanship in the respective angles and sizes; the walls being always of uniform width and height the one with the other of its own class.

The brood cells of queens are built perpendicular in their relative situations, and are considerably longer than those of working bees or drones. In form they are oblong spheroids, tapering gradually downwards, strongly built at the top, and the mouths or entrances being always at the bottom.

The period at which the queen begins to lay may be retarded by the temperature of the atmosphere, and the young swarms are dependent also in a great measure upon the same cause for early or late development. In this part of the country swarms seldom migrate from the hive earlier than the first or middle of May. In Maine, May swarms are seldom seen, but the further South they may be the earlier are the swarms. Not half the bees that are hatched form separate swarms, although coming from the cells about the same time. Many of them mix in and unite with the old stock.

A first swarm of the season is always led off by the old queen: unhatched queens being left in the hive, as well as the germs of an entire new swarm. As the life of the queen bee does not exceed a year, it is easily discovered that there is frequent "succession in office" and "change in the administration."

At the end of August or early part of September, the principal part of the drones—but not all—are killed off by the working bees or driven away from the hives; the workers using their stings without fear or mercy in executing their tasks.—However often a drone who may have been wounded or driven from the hive may return and strive to enter, he is as often forced away again by the workers or killed at the entrance to the hive; while drones who left the hive in the morning before the work of destruction commenced, are permitted to re-enter without hindrance or molestation. I have sprinkled a little flour over those that I wished to recognize. What may be the occasion of this partiality unless the queen has her "favorites" I must leave for scientific apiarians to explain; but I am equally certain from my own observation that all the drones are not always killed off in the fall, nor all the drones in embryo, for I have frequently examined swarms in December and January and found drones in the hive. In two or three instances I believe, I found no drones, which clearly demonstrates, as those hives swarmed early, that drones are not essential to the development of the embryos, however much they may be required

in their production ; and that the queen may deposit her first spring swarm from an autumn impregnation, or else that she has intercourse with drones of other hives.

The usual temperature in a a hive is 74° Fahrenheit, and has been known as high as 104°.

The young swarms in old fashioned hives usually remain at least two days—many times a longer period—before issuing or attempting to fly. They never leave the hive permanently unless accompanied by a queen. They usually and almost always take a sunshiny day and calm air for their removal. Sometimes several swarm will come from a hive in rapid succession. Four ordinary sized swarms have been known to be sent off from one hive in 18 days, and I have known of instances where six and even seven swarms, ordinarily good ones, have all been sent from a hive in a single season, viz : from the middle of May to the 1st September. But hives that send forth so many swarms, collect and store but little honey. There is a great difference in the fruitfulness of queens : while some will produce three, four, and even five swarms during the season ; others will produce but one or two, and others again not any at all, even though their hives stand side by side with each other. Second and third swarms frequently come out and return again to the hive ; but first ones very seldom. This is owing to the young queens being sometimes unable to fly when they first come out of the hive.

Where the bees are permitted to *swarm out*, several queens are sometimes observable amongst them ; these are not the first of the season, but subsequent ones. As before remarked, the old queens usually accompany the first swarms when they are permitted to swarm out, *and are always accompanied with a proportion of old workers*, from which it is reasonable to infer (laying aside the experiments of naturalists) that no swarm of bees consists of all of equal age and generations. I have known of one swarm that lived in an old fashioned hive 14 years (the old combs having been sometimes broken out) and sent forth many swarms ; but for the last four years no swarms were produced from that hive. I then transferred them to one of my improved hives, from which they sent forth two very large swarms in two months, as I permitted them to work undisturbed and to swarm out.

When a queen dies or is lost, unless there is a young queen or a royal egg unhatched within the hive, for all practical purposes the swarm by itself is destroyed, and they should then be united to a weak hive. But swarms deprived of their queen have been known to work advantageously for from 5 to 15 days (where there was no queen or royal egg in the hive) and then abandon the hive, although full of honey.—Within that period, if there were a royal egg within the cell, it would be hatched out.

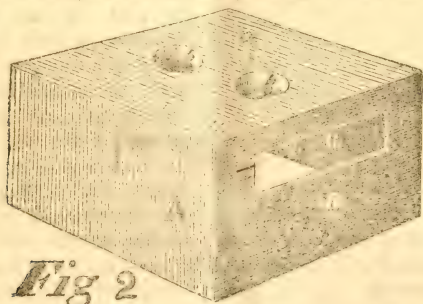
Bees are not strictly hybernating, although many naturalists state that they are. When the season has not been favorable for their operations in the latter part of the summer, the danger of their failure to survive through the winter is greater than when the production of pollen and farina has been plentiful. This latter circumstance is said by some to arise from a deficiency in the quantity of honey stored by the bees; but I have strong reason for believing that it arises chiefly from the bees being in a worse bodily condition, and having but a small quantity of nutriment stored up within their own systems, which alone enables them to pass some portion of the winter in a state of repose.

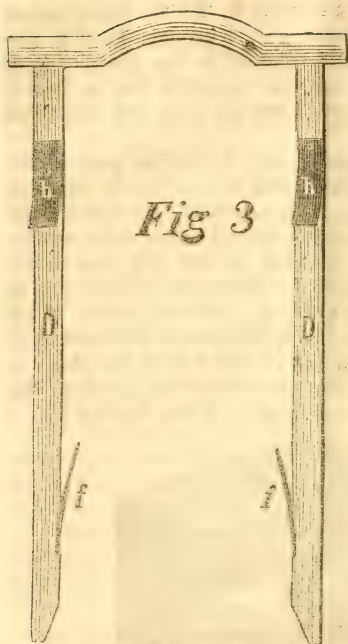
With these general remarks upon the subject of bees—their characteristics and peculiarities, I shall now proceed to describe fully the method that should be pursued in their management and culture, and give a full description of the hive invented by me, which has been thoroughly tested in every way and meets the universal approval of all practical bee culturists who have tried them. I have perfected it in its present form after several years of continual study and observation, and taking into consideration every point, I believe, necessary or discoverable in the management of bees.

One main object of my improvement is to prevent the hatching of the eggs of the Miller or Bee Moth, and thereby to protect the bees against that formidable enemy, the ravages of which have put a stop to the attempt to keep bees in most parts of our country. Numerous attempts have been made to effect this, but neither of them has been attended with success. I am well assured, however, from long continued experiments, that the mode herein described will be found effectual. Another intention of my improvement is to arrange the respec-

tive parts of my hive in such manner as that the honey which is taken therefrom shall always be such as has been newly made, and to leave the bees undisturbed in the compartment in which they are working, and also to enable me to form a new swarm from the young brood that has been left in a filled hive.

In the accompanying drawing, fig. 1, (see last page of the cover) is a perspective representation of a series of boxes or hives, A, B, C, one of which, A, is removed and shown separately in fig. 2. These boxes slide in and out of their respective cases in the manner of drawers, so that they may be removed and replaced when desired. They are entirely open at their lower sides, but have a cover *a, a*, at their upper, which is perforated with two or more holes, 2 inches in diameter, *b, b*, to allow the bees to pass from one hive or box to the other: *c*, is a glass in front, through which to observe the interior. In fig. 1, there is a space A, unoccupied by a box, the box





which I will suppose to have constituted the uppermost of the tier A, B, C, being as above stated, removed, and the two B and C having been subsequently raised so as to leave the vacant space A at the bottom. This removal of the upper and the raising of the two lower boxes is an important feature of my arrangement; D, D, are two lifting rods with which each hive is to be provided; these slide up and down in grooves made in the sides of the case containing the boxes; a part of one of these grooves is seen at *e*, fig. 1; fig 2 is a separate view of a pair of these lifting rods, which have spring catches *f* at their lower ends that catch in recesses *g*, fig. 2, in the lower box, and raise it and the one above it into the position shown at B, C; *h* are two spring catches that serve to hold the boxes B, C, in place, until a fresh one is made to occupy the space A. E, fig. 1, is an inclined plane formed of a sheet of zinc or other metal, up which the bees ascend to the lower box or hive from the back part of the structure; this plate rests at the back on the stand or platform which supports the hive, which platform is to be of stone or wood covered with sheet metal for a reason to be presently given. F, is the place of entrance of the bees up the inclined metallic plate E. The case containing the boxes or hives shown as resting on the support or platform G, which as above indicated, is to consist of a flat stone or of plank covered with plates of zinc or other metal. Between this platform and the inclined plate E, there is an enclosed space H, the only entrance into which is through

position shown at B, C; *h* are two spring catches that serve to hold the boxes B, C, in place, until a fresh one is made to occupy the space A. E, fig. 1, is an inclined plane formed of a sheet of zinc or other metal, up which the bees ascend to the lower box or hive from the back part of the structure; this plate rests at the back on the stand or platform which supports the hive, which platform is to be of stone or wood covered with sheet metal for a reason to be presently given. F, is the place of entrance of the bees up the inclined metallic plate E. The case containing the boxes or hives shown as resting on the support or platform G, which as above indicated, is to consist of a flat stone or of plank covered with plates of zinc or other metal. Between this platform and the inclined plate E, there is an enclosed space H, the only entrance into which is through

openings seen at I, I, I, fig. 1. Through these openings the Bee Moth will enter and deposit its eggs, and in this situation I have fully ascertained that they will not hatch and produce worms,—a result apparently consequent on the moisture retained within this space, which is entirely enclosed by metal or by metal and stone, where the germs invariably perish—*it appearing that wood or other vegetable matter is necessary to their vitality.* On the back of the case behind each series of boxes, there is a vertical groove made for ventilation, and this is covered at its upper end by a perforated plate of metal, the perforations being made small to prevent the entrance of insects, and at the back of each box there is a similar ventilating plate.

This apparatus may be varied in size, but I make the boxes A, B, C, each 7 1-2 inches high, and 12 inches in width, and 11 3-4 inches in depth, and find this size most convenient, not only for the accommodation and management of the bees, but also for the purpose of making hives in large quantities, as suitable lumber can generally be obtained to suit those sizes more readily than any other; and my directions to all my agents and assigns have been to have all hives that are made on my plan, uniform throughout the United States. The advantage of this will be discovered when the fact is taken into consideration that a change of boxes (as above suggested), sometimes takes place in the necessary management of bees, as well as the facilities that such a method will afford to those who carry their honey in boxes to market or send off large quantities, as they can thereby reap the value of the boxes, and virtually save them without disturbing or changing the honey,—for other empty boxes from any hives, if made according to these directions, will fit the hives of one apiarian as well as another. The boxes A, B, C, will each hold from 24 to 26 pounds of honey in the comb.

The outer case should be made of inch boards, viz: sides 12 inches wide and 25 1-2 inches high; the back 14 inches wide and 24 inches long, fitted to the top, but elevated half an inch to allow of the entrance of the bees beneath. But of course it will be understood by the reader, that in regard to the back, it would be immaterial if it were 25 inches, provided that suitable entrances were left for the bees. I merely put that de-

finite size for it to secure the entrance at the proper place.—The top should be 14 by 16 inches square. A base or sill 1 1-2 inch high and one inch and a half wide, beveled off a little towards the back, should be fitted in beneath the door, as an elevation for the end of the inclined plane or sheet of metal, (letter E, fig. 1,) as well as for other purposes. This sheet of metal should be 11 3-4 by 12 1-2 inches square, so as to fit in perfectly and turn up half an inch in front; two strips of zinc or metal, (each 2 1-2 by 12 inches) are so placed on a line with the upper surface of the sill, one inch from the bottom, (and tacked on) that while they effectually line the lower edges, they form cleats for the inclined plane E to be shoved on and rest upon when necessary, and to pass between the two front ends of them and the sill, so as to form the inclination, as represented in the cut,—so that the sheet of metal II, will be admitted either on a directly level or by an inclination. The under part of the front sill should also be lined with a piece of metal 1 1-2 inches wide and 14 inches long. The sliding rods (Fig. 3,) should be half an inch square and two feet long, with springs half an inch by two and a half, or three inches (hoop iron, hammered,) attached as shown in the cut Fig. 3, to catch in the recesses (g, fig. 2,) in the sides of the boxes.—These rods or slides are let in and work in square grooves cut perpendicularly in the sides, about half way between the front and back. Two pieces of zinc or metal 2 1-2 by 8 inches each, are used for dividers, to slide in between the boxes when necessary, or to cut off communication, being placed over the holes in the top of the box where it is wished to confine the bees. The holes in the top of the boxes should be at least two inches in diameter. In the back of each of the boxes should be bored a hole an inch in diameter and covered with a small piece of metal fully perforated with holes for ventilation—being in contact with the perpendicular semi-circular groove (1 1-2 diameter) in the inside of the back of the case.—Two ventilators should be placed in the back, 1 1-2 inches in diameter each, in contact with the last mentioned perpendicular semi-circular groove, and covered like those in the back of the boxes, with perforated metal. The upper one of these principal back ventilators should be about one inch below the top, and the lower one about 8 inches above the bottom. The

handle on the top, connecting and holding the slides or rods, should be 1 1-2 or two inches square, trimmed down properly, and 14 or 15 inches long.

Great care should be taken to have the boxes slide up and down easily, and it would be well to scant the width of them a little to allow for swelling from moisture, &c., and the rods likewise.

When the bees begin to work in such a hive, it is usual to cut off the communication with the upper box by sliding in a divider above the holes in the top of the middle box, or the one below it, (according to the size of the swarms,) and let the bees commence work either in the middle or bottom box. If they commence in the middle box, of course when they get it full or nearly so, they will mostly descend and commence work in the box below,—or in the one that may be *placed* at the bottom by means of the lifting rods, in case they originally commence work in the bottom box. The bees should in all cases be kept at work as near the bottom of the hive as possible, not only for the ease and rapidity with which the bees can work there, but also as affording perfect protection to their labors and works from the ravages of neighboring swarms if attacked by robbers and insects of any description, but also to facilitate the regular order of their work in the changing of boxes, &c. When they have got a box principally progressed in, the queen and the general inhabitants of the hive will be ready to descend to a lower box, while the one above will contain but few, excepting the germs or young in the breeding comb, if any,—or workers sealing up and finishing out the comb. The box at the top, say A, is to be removed when the bees require more room, and placed at the bottom, and then B in succession. In its turn, B, or C, whichever may have been filled first, is of course elevated to the top. The box thus first filled is to be removed when more room is required, and for safety *should be placed as the middle one of another* vacant hive, where, if there are young bees in breeding comb, they will hatch out and go to work in regular order;—having an empty hive or box beneath their hatching place to commence work in, without, in fact, ever being aware of any change in their situation. The same changes can then be repeated from time to time when necessary, as previously with the parent hive.

I make the suggestion of placing a box whenever taken from a full hive into an empty one for two or three days, in order that the culturist may ascertain from observation, and without danger to his person or his interests, whether there are young bees in the box. If there should be a young swarm in the box thus removed, they will soon hatch out, *being attended by the nursing bees, which never leave them until fully developed*, and as I have before said, will go to work in due time. If there should not be a young swarm in the box when removed, of course the few bees that may be there, will in a very short time leave the box and return to their original hive,—when the box of honey can be emptied, and the box placed in its proper hive. As a general thing the practical bee culturist can tell at a glance, by looking through the glass in front of the box, whether there are young bees there.—If there are, and they be yet unhatched, there will be a large number of bees in view almost like a curtain, covering the principal part of the comb towards the glass, and the comb itself will be of a yellowish cast. Should there be a young swarm there, only just hatched out, the appearance of the comb would be nearly the same where visible, while many young bees (easily recognized by their size and their wings) would be seen mixed in with a few old ones.

If there are no young bees in the box, the color will be almost perfectly white; and if the box is finished the cells in view will be capped, and very few bees or guards be visible,—for they descend as the work is from time to time completed. This is the only *natural principle* upon which bees will work, as we discover in all their *natural* habitations.

Under this arrangement of the hives or boxes, new honey will always be obtained from them successively, while those in which the bees breed and feed, will also consist of new honey.

Some bee culturists have at times deemed it expedient to bury their hives in trenches, and cover them with straw during the winter; in such cases I have uniformly remarked that the bees have eaten but little honey, comparatively;—but the hives, as ordinarily constructed, have been found to be then subjected to the ravages of mice. When the hives are constructed on my plan, they are, of course, secured from this enemy, by means of the metallic bottom (E, Fig. 1,) being slipped in level under

the lower box, above the cleats, so as to close it. This metallic plate E, should always be perforated with plenty of small holes, to allow the air to circulate, while at the same time insects are debarred from the hive. When necessary to remove the hive, the zinc or metallic plate E, should be shoved in, in the like manner.

In regard to burying the bees in trenches, I cannot say that I approve of it. The honey is apt to become mouldy and sour, and worse than that, the health of the bees frequently becomes impaired by it. I prefer that bees in winter should be shut in the hives and not permitted to come out until the spring is well advanced—certainly not until maple trees are in blossom.—They should be kept in a cool and quiet place, not exposed to the storms and snows of winter; and if not shut in entirely,—in a dark place, where no rays of light of any kind can enter the hive. When this is done, it will be found that they consume but little honey, and are uniformly in good plight when let out. *They will not move much in the dark.* If left out in the open air and permitted to come out during some of the few hours of sunshine that a wintery day sometime affords, they will empty themselves repeatedly, and require a proportionably larger quantity of honey for their sustenance; besides, many,—very many,—will perish on the snow and ice. The quantity of honey usually required to sustain an ordinary swarm of bees when kept closed in the hive until they can find sufficient stores for themselves in the spring, is from 5 to 8 pounds;—I have never known a swarm when properly shut in my hive and attended to during the winter, to make way with more than the latter quantity. Sometimes, however, I have known instances where the bees having been let out too early in the spring,—(having wintered well on a small proportion of the honey in hive) would use all the honey within their hives, in a very few days, and then require feeding to prevent their starving to death. Even as late as the middle of May, in this latitude, we frequently have several days of cold chilly and damp weather, in succession. During such spells it would always be advisable to shut the bees in again, until better weather, as they are then more critically situated in bodily health, and for provisions, than at any other season of the year.

Should it be discovered that the bees in a hive have not suf-

ficient honey to last them through the winter, more can be added at any time, by putting it on the zinc bottom beneath the lower drawer, or, if there is room, directly into the box where the main body of the bees is. This should generally be done at night, as the bees are then less inclined to fly out of the hive,—and should, of course, be done cautiously.—When honey cannot be obtained sugar is the next best article that can be fed to them; a little salt should be mixed with it.

When removing from the hive a box containing a young swarm, or honey alone, it is advisable to place one of the zinc or metallic slides (3 by 8 inches) over the holes in the top of the box beneath it, and then by slipping in the zinc plate E, above that slide, and immediately below the edge of the box to be removed, it forms a bottom to that box upon which it may be drawn out separate, while the slide prevents any bees from emerging from the top of the next box. The one above can be removed and not a bee can fly from it as one of those small slides or dividers is, or should be, always kept over the holes in the top box, to prevent the bees from getting out into the case. The bees will usually be found to have fastened down the edges of the top and middle boxes by farina and a little wax, to the top of the box below, for the purpose of protecting their stores, to exclude ants and other small insects, &c.; *but their combs they do not fasten to the top of the box below.* When necessary to remove a box, if fastened down or sealed, a slight jerk upwards will readily loosen it, without disturbing the bees materially.

Bees should be salted occasionally, during the summer season. Their locality should be free from weeds, spider webs and rubbish of every description. They should be set upon a platform of stone or zinc, about a foot or 15 inches from the ground, for if too low many will be caught and devoured by frogs, toads, field mice, &c. They should not be further than the latter distance, to create moisture around the base of the hive, in order to protect them from the bee moth,—of which more hereafter.

Bees generally thrive best in the neighborhood of streams and rivulets or rivers. They require water in the elaboration of wax for their cells and for their own sustenance. Where water is not nigh, it should be supplied by placing near the

hives shallow pans of clear and clean water, with pebbles in it, for the bees to alight on and save them from drowning.

Wherever the white clover grows most abundantly the bees are always certain to do well. Red clover is good, and together with saintfoin, buckwheat, and the ordinary wild flowers natural to all parts of the country will, during the season, afford common pasturage in almost any situation. Bees frequently go five, and even ten miles, for farina, &c. Where an abundance of flowers are cultivated, the bees progress with their work more rapidly than elsewhere, as there is then a great saving of time and labor in their collections. It would therefore be advisable that the gardens where the hives are situated, should be well stocked with suitable plants. The hives should be near the residence of the proprietor, as well for the purpose of familiarizing the bees with his family, as for affording them the necessary attention. The hives should be placed so that *the entrance for the bees should face the East or South*, for then the first rays of the morning sun will call them out early, and the hives will be best lighted for a longer period.

I have called the entrance for the bees the *back side* of the hive. All hives should be placed in such a situation that the doors will admit of being approached for making observations and examinations, without interfering or coming in contact with the bees, and should be firmly secured, either by shelter or fastenings, from being blown over by heavy winds. They should stand not less than a foot apart. The platforms should project several inches in front of the entrance, for the bees to alight on when returning to the hive. They should be guarded from the extremes of temperature, not exposed to the drippings of trees, nor in the vicinity of noisome smells, or disagreeable noises, and out of the interruptions occasioned by a public footpath. The least jar, or stepping upon the floor on which they are stationed, produces temporary suspension and confusion in the hive. They should never be very deeply shaded by trees or shrubbery; on the contrary during the breeding season, from 1st May to 1st September, the fullest rays of the sun will tend to expedite the process of hatching; there being a vacuum between the boxes and the case there will never be any danger of the honey "melting down"—nor will external wet, rains and dews upon the case, affect them.

The temperature of the boxes is thereby kept safe from the ill effects of the sudden variations to which the climate of the United States is so liable. After the breeding season is over it would perhaps be advisable to shield the bees somewhat from the sunshine; but the solar rays are useful in preventing any accumulation of dampness within the hive or upon the glasses in front of the boxes. The ventilators of course keep up a healthful circulation of air within the hive. No houses, walls, fences, &c., should be permitted to obstruct their issuing or return in a right line, to, or from, the hive. Commons, surrounded by woods, make an apiary productive.

Some persons suppose that bees will not thrive well in cities or villages; this is an error. Provided a good locality can be obtained for the hives, they invariably do well, as they always collect abundance of material from the sugar and molasses hogsheads, cultivated flower gardens, the refuse of kitchens, &c.—The principal trees from which bees usually gather their stores, are the sugar maple, willow, poplar, cycamore, &c., which can generally be found in or near cities and villages; besides these, most, if not all kinds of fruit trees, yield large quantities.

During the season for making honey, bees thrive most when the showers and dews are frequent. Besides the ordinary dews, during favorable weather *honey dews* frequently occur; several theories exist to account for them. Most naturalists regard them as exudations or secretions from the surface of those leaves upon which it is formed, produced by some atmospheric stroke, while some few view them as a kind of vegetable perspiration which trees, plants, &c. emit for their relief in sultry weather;—its appearance being never observed in an ungenial summer. Again, others view them as the exuvie of the insect called the *aphis*, or vine tetter. These insects may be distinctly seen, by means of a magnifying glass, on the under surface of the leaves of the cherry, lime, willow, &c., congregated by thousands, and emitting their exuvia. Honey dew usually appears upon the leaves as a viscid, transparent substance, as sweet as honey itself, sometimes in the form of globules, at others resembling a syrup. It is generally most abundant from the middle of June to the middle of July, and sometimes as late as September. It is found on nearly all kinds of trees and plants. Some years afford but few or no honey dews.

Bees when building their comb generally build it in parallel rows, beginning and fastening it at the top, as was before remarked, and in working down they always leave sufficient room below for themselves to pass in every direction around and under the comb.

The earliest swarms of a season are *usually* the best, and strongest; subsequent ones more and more diminished in numbers. A good swarm of bees alone, will weigh from three to four pounds. Those who are timid may ascertain the strength of a swarm, by rapping smartly two or three times on the sides of the hive. If it contain a strong family, there will be a loud humming noise within, somewhat protracted; if a weak one, the noise will be sharp and brief. When a swarm is doing well the bees will depart in quick succession, and without lingering about; the hive, however, will be guarded by sentinels, either immediately in front of, or directly within the entrance.—When the bees return with their legs yellow, or loads upon their thighs, the swarm is doing well, and no apprehensions need be entertained as to their order and regularity;—for if there be any trouble within the hive, the bees will not gather and import their stores to the hive, nor issue and return in quick succession, nor exhibit the evidences of order.

When a swarm is attacked by neighboring bees, frequent conflicts will be observed in front of the entrance, and at intervals, the robbing bees will be seen with their loads of plunder, issuing from the hive. By sprinkling a little flour upon the bees as they pass back and forth, the strange bees can be recognized, by observing the entrance a short time. In such case the hive should be closed by shutting the bottom, thereby giving your own bees the advantage in point of numbers, to prevent the robbers inside from doing damage or being reinforced. About sundown, if the hive be re-opened the robbers will depart, and the bees belonging to the hive that were out when it was shut, having returned home by that time, can re-enter. The robbers will not suffer themselves to be imprisoned very often. Should the proprietor be able to discover the robbing hives, and the robbing swarms still persist in their efforts, by breaking their comb a little, with a straw or knitting needle, their honey will begin to run out of the cells, and the robbers will have enough to do to stay at home and take care

of their own stocks; or they may be shut in their own hive for a day or two, which is generally attended with the desired result.

The practice with apiarians of fumigating the hives by blowing tobacco smoke &c. into them, is always attended with more injury to the swarm than benefit. But sometimes circumstances may warrant the risk of blowing a very little tobacco smoke in the hive, when it is desirable to enliven the bees, and produce forced action, for the purpose of ascertaining their condition. The nearer to their natural habits they can be managed, the better will be the success attending their culture.

However populous a hive may be, and however favorable may be the health and situation of the bees, the number in a hive is always greatly diminished during the fall and winter, on an average more than three-fourths. For instance a swarm that during the working season numbered from 20,000 to 25,000, is usually reduced by February to from 3 to 4,000.—This loss is more than replaced by the amazing fecundity of the queen. Hence arises the disposition to throw off swarms, which of course will issue more or less early according to the temperature of the season, when the bees are allowed to swarm out. The crowded state of the hive is usually considered sufficient to account for the exodus of swarms.

The queen usually commences depositing her eggs about the last of March or first of April, and after the 'first swarm' is hatched the migration soon takes place. Although the crowded state of the hive is supposed by many to be the cause of the swarms departing, it is well known that the bees will sometimes cluster outside of the hive for weeks together. The usual life of the working bee does not average over five or six months; some few, perhaps, a year.

In favorable seasons and situations, three swarms from one hive in a single season, are a fair and very usual average; and from the first and second swarms of a hive, subsequent swarms are commonly obtained,—all ordinarily good. Should swarms be considered as generations, a hive not only sends forth two or three swarms of children, but they, and *their* children, (to the third generation!) sometimes increase and "multiply" the same season. First swarms are always more particular in selecting a fine day for swarming than subsequent ones, for upon

them, as being the most important, principally depends the propagation of the *race*. The frequent succession of swarms must be owing to the great number of mature princesses that are allowed to quit the cells. From several obtaining their liberty at nearly the same time, two, three or more, will frequently accompany a second or third swarm, and after hiving, struggle for dominion, and but one being left, several dead ones are often seen about the entrance to the hive, within a few hours afterwards.

One of the strongest symptoms of swarming, or of the ripeness of a young swarm, is, that a singular noise, called *piping*, is heard for two or three nights within the hive. The notes are generally clear, but rather plaintive; sometimes two or more voices, rather more sonorous, respond to each other,—being those of the queen and young princesses not emerged from their cells. But in hives where they are not allowed to swarm out, the above affords a good indication of the condition of the bees and young swarms. *When swarms are too small, they may be united advantageously, by putting two or more swarms into one hive.* All the queens but one will be destroyed, and the bees will “unanimously” submit to the dictation of the conqueress. The same plan may be adopted for removing, and putting them together, that was before suggested for dividing swarms. All swarms should be kept strong, in point of numbers, as they will work to better advantage and be more able to take care of themselves.

Without attempting to make suggestions in regard to the diseases of bees, of which little can be known for certainty, (more than by judging of their condition by general observation founded on experience,) I shall now allude briefly to their principal enemies. These are chiefly birds, mice, slugs, hornets, wasps, ants, spiders, and last—though not least—the *Miller* or Bee Moth, (*Tinea mellonella*, of Linnaeus) by some called the ‘wax moth.’ Wasps are very daring, and will brave a host of bees to procure a little honey; one of them is a match for three bees, in strength and agility.

In this country the most destructive enemy of bees is the bee moth. So great have become its ravages, that hundreds and hundreds of apiarians have, of late years, abandoned the bee culture entirely, believing that no efforts or exertions could

have their swarms. In those sections of the country where bees have been kept the longest, and in the greatest numbers, the millers appear to increase in numbers and destructiveness every year. In the Western States their appearance has given great anxiety to all bee culturists, as their ravages and depredations are so well known that even their appearance causes their approach to be dreaded.

The Bee Moth usually appears around weak hives, about the end of April, and is to be seen from that period until the end of October. It is of the *papilio* tribe, flies only by night, and is of a whitish or brown gray color. A small number of these diminutive insects having formed a settlement in a hive, perforate and break down the cells, and with the fragments construct new edifices or galleries for their own lodgment and accommodation. They are very nimble footed, and active in their movements. At the approach of evening, and on moonlight nights, as well as almost any evening, during the summer season, by aid of a candle, these insects will be seen hovering around and watching opportunities to enter the hive, whilst bees that have to guard the entrances, may be seen, like vigilant sentinels, extending their antennæ to the utmost, and moving them to the right and left alternately,—as bees require light to see well. The moths therefore evade the bee sentinels, and very artfully slide into some crack or crevice out of the reach of the bees, near the base of the hive, or in some portion of the comb, if possible, out of sight, where they effect lodgments and deposit their eggs. A small caterpillar is formed some days afterwards, and inclosed in a case of white silk, which it spins around itself. At first the larvæ are like mere threads; but gradually increase in size, and during their growth, if upon honey comb, feed upon the cells that surround them, or derive sustenance from wood or other vegetable substance upon which they may have been deposited. But they cannot come to maturity unless they have honey, wax or vegetable fibre to subsist upon. Moisture destroys the larvæ or embryos. While the larvæ are in the pupa state, the scales or helmets upon their heads and necks, (which are impenetrable to the stings of bees) protect them until they emerge and become winged moths or butterflies. The larvæ deposited in the fall remain in the pupa state (unhatched) until about the

first of May succeeding; but are brought to maturity sooner or later in the season, according to the temperature. The females are remarkably fertile, and if their eggs be deposited within the honey comb and permitted to remain undisturbed, will soon overcome and undermine the commonwealth. Such is their havoc and surprising increase, that swarms of bees are not only destroyed by them, but frequently large swarms have to abandon old fashioned or other hives, even though heavily stored with honey, "and commence the world anew." They are most apt to attack old strong scented comb, and will even *force their way through new comb* to reach such as contains exuvia and unhatched bees. When they succeed in getting the mastery over a piece of brooding comb, they readily kill all the young bees, and frequently so great is the stench in the hive from their decomposition, that the old bees, queen, drones and all, "have to retire in disgust."

As a remedy for this principal and growing evil, I trust and feel convinced from continued practice, study and experiment, that I have found a perfect and entire remedy and protection, in the hive with the metallic bottom and alternating principle, herein before explained; for besides what has been said, I may call attention to the subject in another light. Should a miller succeed in depositing eggs in the comb, (the comb in these hives is always *new*, comparatively,) and the larvæ of these eggs should winter and hatch in that comb, as they do no damage until spring, they can do none *then*; for all the comb in the hive through the winter will always be removed early in the spring before the millers *could* do any damage to it.

The difficulty with all other hives is, that the bees are obliged to live and breed in the same honey comb year after year. Sometimes they have done well for three or four years in succession in those hives, but unless the old comb were broken out every year or two, the bees were certain to "run out," or "die off." But this practice is attended with so much danger to the person as well as to the swarm, that few either dare pursue it, or ever become successful in their endeavors for any considerable length of time. In old fashioned hives they always have to "take up" their swarms to get any honey, unless they put a cap on the top of the hive and force the bees to work in there after they have got the main body of the hive

all of honey and comb. In the main part of the hive the swarms
 live and breed until they die or are taken up. To force them
 to work *up* is as unnatural as for water to run *up*. The other
 patent hives amount to little more than the old fashioned hive
 with the bees always remaining together in the main part
 year after year in old comb (!) with a few little boxes and
 traps where the bees bestow the last of their work—that which
 they most require for their winter nourishment and support—
 and the thickness of wood, *one thickness lying flat directly ap-
 gainst the other*, and the numerous cracks and crevices between,
 afford secure breeding places for the millers and vermin that at-
 tack them. In fact all other patent hives embrace the same
 old principle—the old fashioned hive with complex machinery,
 but without definite principles or objects, and not half as good
 for their additions.—the bees remaining in fact in old comb
 in the old fashioned hives. They do not go to the founda-
 tion of success, and change the comb regularly, to allow of the
 full development of swarms, and keep them healthy. — By the
 use of my hives, as shown, the bees are always preserved the
 same as young swarms; the natural life of the bee being but
 six or 8 months, and no swarm ever consisting of all of the
 same generation, sufficiently establish the truth of the general
 and natural principles upon which my hives are constructed.
 My hive is in fact the *reverse principle* of the old fashioned hive,
 I may say so; although it is the oldest principle extant with
 bees—the principle of nature. If we examine a bee tree, for
 instance, we will find that the bees have commenced at the up-
 per part and continued to work down, work down,—building
 and storing away honey, or breeding young swarms in the cells
 and building royal cells, (which are always partially or wholly
 destroyed after the young queens are hatched) from the upper-
 most portion to the latest comb made. Sometimes in such
 trees we find large quantities of honey,—sometimes candied
 and discolored by age; but *as long as the swarm has room to
 work down,* they are industrious, and never are the cells or
 comb, however old, thick and composed of several coatings or
 linings; nor will any part of it usually give evidence of hav-
 ing been used more than once for the production of young
 swarms. I am satisfied that bee culturists and bee hive inventors
 have not sufficiently studied the *natural* disposition and charac-

teristics of bees, or one would not have followed the other so long,—making no change in reality in the *principles* of their hives, but only in their *shapes*.

An ordinarily good swarm with common pasturage will usually make from 50 to 75 lbs. of honey in a season, over and above that taken away with young swarms. In the spring all the honey can be taken away, as then the bees no more require it, than a cow wants hay when she can get a plenty of grass!

I will now present a short practical view of what may be done in the way of *business*, by the bee culture. As the generality of swarms during a season will bear division, or the abstraction of swarms, once certainly, and a full majority yield two and three swarms each, every season, (without taking into account those that will be obtained from swarms the produce of swarms of the same season—generally quite as many more,) the surplus swarms over and above *one* from each hive that has been kept over the winter, each season, will assuredly be sufficient to keep good the number of the preceding year, and add one where bad fortune or mismanagement may have diminished it; so that to cover all contingencies I will say, only one swarm increase from each hive per annum, and show what would be the number of swarms, the value of the bees and the amount of honey that could be obtained within and at the expiration of ten years. The alternating principle of my hives affording the bees, always, plenty of space, they are kept industrious the whole season, and the time of none, is wasted in ‘lying out’ idle, during the greater part of summer, because their hive will contain no more.

Say two swarms are put into my hives in May; ordinarily, they will each yield a swarm by division, by or before the middle of July, and two boxes of honey during the season. The account would stand thus, should an account be kept of their labors and the number of swarms be kept good, viz :

1847. May, purchased 2 swarms of Bees	2	
“ Aug., by increase one swarm, and 2 boxes of honey from each,	2	4
1848. 1st Season after, By increase one swarm, and 2 boxes of honey from each hive on hand the last autumn,	4	8
1849. 2d season, “ “ “	8	16
1850. 3d “ “ “	16	32
1851. 4th “ “ “	32	64
1852. 5th “ “ “	64	128
1853. 6th “ “ “	128	256
1854. 7th “ “ “	256	512
1855. 8th “ “ “	512	1024
1856. 9th “ “ “	1024	2048
1857. 10th “ “ “	2048	4096
Total	4096	8188

The value of which would be as follows:

For 4096 swarms worth \$3 each,	\$12,288
For 8188 boxes of honey averaging 25 lbs. each say, produce within the period 204,700 lbs., worth at 12½ cts. per pound,	\$25,587 50

Total value of bees, honey, and incr. for 10 y'rs, \$37,875 50

Money doubles itself in about the same period, when placed at compound interest. Two swarms of bees, with two of my hives, and an individual right, will cost about \$16, which within about ten years will realize to a man a handsome fortune over and above all expenses; when, if the same sum were placed at interest strictly, all the time, it would amount to only about \$30. The honey obtained each year with proper management would certainly pay the expenses of making the hives, and amply repay all expenses attendant upon their care and management, or the assistance necessary. Therefore in addition to the value of the swarms, and \$1 each for the value of the hives (certainly the value when sold in small lots) the apianian would be worth \$16,284, over and above all loss and expenses of every kind.

No department of the government has, of itself, been of more benefit to the people generally, than the Patent office, nor been confided to the management of more discreet and scientific men. Perhaps it is not generally known that the Commissioner of Patents communicates to Congress annually, a report stating all the proceedings, expenditures, &c., of his office, and the improvements that may have been made from time to time, in the different departments of science and industry. These reports, as full as they have been for three or four years past, and containing the many suggestions from the Commissioners, and men experienced in every branch of scientific or useful occupation, are invaluable, and well worthy of the notice that Congress takes of them. Although the last report contained some 600 large octavo pages, 28,000 copies of it were ordered printed for distribution. The suggestions and remarks being the results of experience, and coming from a department where all such information centres—where the latest discoveries become known, or the wants of the different branches of industry become manifest, are entitled to the most earnest attention.

In regard to Insects, Bees, &c., the Commissioner in his report for 1844, page 313, says :

“Concerning the *destruction of insects*, a subject of vital interest to farmers, but little has been done. Patents have been granted, from time to time, for preventing the ravages of the wheat fly, and other species of the insect kingdom troublesome to agriculturists and orchardists—some of them efficacious, but most of them too complicated and expensive for general introduction. The failure, in most attempts of this kind, has been probably due to a want of attention to the habits of the insects in their several stages of existence, viz: the embryo or egg, the larva or grub, and the imago or fly state. This is particularly exemplified in the case of the bee-moth, against which no perfect safeguard has yet been invented.

“No branch, perhaps, of agricultural, or rather rural occupation, has been so much neglected in this country, as *bee culture*. Wherever it has been attempted with care, it has always proved profitable; but many who engage in this business, abandon it—for the reason that the bee is left to be its own protector against its many enemies, but more particularly

against its common enemy, the bee-moth. A large number of applications for patents have been made for improvements in bee-hives, most of them with reference to this very point, viz: protection against the moth; and it might be reasonably inferred, from the fact that applications are continually being made for this purpose, that no complete remedy has been devised.

"From the character of many of the inventions, it is obvious that the habits of this insect are not studied; and it is to be regretted that, while naturalists and apiarians have so long investigated and made themselves familiar with the domestic habits and whole economy of bees, they have neglected to notice this their predatory, and ultimately fatal, enemy. In Virginia, it is a common practice to put the hives upon the ground, as a security from the moth; and I can testify to the fact, that the bees in well made hives, protected by a covering from rain and excessive heat, under these circumstances thrive well. The eggs of the bee-moth are deposited usually somewhere about the base of the hive, and, after hatching, the larvæ crawl into the hive and commence their work of destruction. It is presumed that the instinct of the insect leads it to deposit its eggs in dry and warm places, and consequently to avoid the ground. The hive is placed upon tiles or bricks, to prevent the approach of mice, &c.

"The bee readily adapts itself to every climate; and although its period for labor is abridged in the more northern latitudes, yet it seems to thrive equally well wherever it can find an abundance of food. An esteemed friend (H. K. Oliver, esq., of Salem, Mass.) has been singularly successful in this culture. I have not space for a detail of his peculiar mode of management, were such proper for this report; but I may state its result. This gentleman, the care of whose apiary is merely a relaxation from graver pursuits, has taken 300 pounds of honey per annum from three boxes; and the average for each of his hives, for several years past, has not been less than 80 pounds. In 1840 he took from one hive 140 pounds, and left 60 pounds for the bees to winter upon. It is obvious that such continued success cannot be merely fortuitous, but must be the result of proper care and contrivance. As the importance of this culture is underrated, or, more properly speak-

ing, but little known, I may be thought to have bestowed more attention to the subject than it deserves. Among the articles, however, which go to swell the aggregate of the annual exports of our country, beeswax forms no inconsiderable item at this time, and is capable of being very largely extended. By reference to document No. 220, of the House of Representatives, (Commerce and Navigation, 1843,) it will be seen that the amount of wax exported the preceding year, was 331,856 pounds, valued at \$103,626. The places to which it was chiefly sent were England, France, Sicily, Venezuela and Chili."

And again, in his report for 1845, page 510, speaking of Bee-hives, he says:

"A growing interest is evident in this branch of agriculture, and a large number of applications have been patented, and a greater number rejected. Most of the alleged improvements have claimed to be remedies against the bee-moth, the pest of the apiarian. As bee culture increases, the bee-moth seems to become more numerous and troublesome, and should therefore be vigorously met by vigilance and ingenuity. In this latitude it requires every attention to save the bees from their great enemy; and so formidable has it become from numbers, that the same devices which may, perhaps, be found to give protection further north, will not apply here.

"Nothing yet seems to be of any value, except placing the hives upon the ground—the hives being made very tight, and the entrance of the bees being as low as possible.

From the Dundee Record.

"We have recently been shown a bee-hive made by Mr. Wm. R. Kelsey, of this town, which is pronounced by many of the most experienced bee culturists in this part of the country, as the most complete hive in every respect, that has ever yet been invented. Mr. K's hive affords positive and complete protection from the bee-moth or miller, and is so arranged as to admit of a free circulation of air through it at all times. The honey can, *at any time*, be removed from the hive without disturbing the bees, or more can be added for the sustenance of the swarm if necessary, while the bees are kept healthy by liv-

ing in new comb, all the time. Bee culturists long since discovered that bees, after living in a hive for two or three years, and being obliged to deposite and hatch their eggs in the *same cells*, year after year, became sickly and died off; and while the first swarms from a hive were usually strong and healthy, and did well, yet subsequent ones were each more feeble and diminutive, until finally no swarms were produced at all. This arose from the bees living in the same honey comb year after year, together with the practice, even by the use of the best patent hives, of taking from them the very honey and comb necessary for their health and comfort, namely, *that which was made last*. As the bees wax the cells over each time that they deposite their embryos, it is evident—and an examination of a piece of old honey comb will satisfy any person of the fact—that the cells which, in new comb are large, and capable of receiving the body of a full grown bee, must gradually become smaller and smaller, untill at last the cells can no longer produce as they should. We are satisfied, from an examination of Mr. Kelsey's hive, that it entirely overcomes those difficulties, while its alternating principle, by which the position of the bees can be changed at pleasure, as well as the entire and easy control that a person can have over the swarm, and its facilities for hiving bees, must give it a preference over every other hive now in use. The mode of hiving is similar to that with the old fashioned hives, but more easily and safely accomplished. Many old fashioned farmers still persist in the cruel and ungrateful, if not wicked practice of "taking up" or killing their bees, in order to get the honey. A good swarm of bees is worth from \$2 to \$4—and the man who "takes up" a half dozen swarms at the end of the season, for the sake of obtaining an average quantity of, say 20 lbs. to the hive, destroys \$20 worth of bees for 120 lbs. of honey, which at 12 1-2 cents a pound, would be worth \$15. Query, how much has he made?

"By the use of Mr. Kelsey's hive, there is no necessity for destroying bees, and from their construction, a hive with a swarm of bees shut in, can be removed with safety to any distance, (as they have free ventilation,) which is an advantage of which, doubtless, many persons residing in the far western states, will gladly avail themselves. In the northern part of

Illinois, and the great prairies of the west, where little or no heavy woodland is found, bees are scarce, and the immense numbers and abundance of wild flowers to be found there, will furnish sustenance and honey without stint, for a few years to come large numbers of bees will doubtless have to be carried there. Persons going west, can purchase any number of swarms, either in Ohio, Michigan, or the southern part of Illinois.

"Although we have devoted so much space to this subject, we cannot close without expressing our firm conviction that an examination of Mr. Kelsey's hive, will satisfy those who keep bees, of the superiority of Mr. K's. over other hives now in use, while doubtless many persons who do not keep bees, on ascertaining that by their use, not only from 40 or 50 to 80 lbs. of honey per annum can be obtained from a hive in one season, but that an extra swarm, and consequently at least double the quantity the following season would be the product, (saying nothing about the wax,) will find it to their interest to keep one or more swarms."

Having disposed of my interest in the improvement for and within a large section of the Union, to different individuals who have commenced the introduction of these hives in different parts, it may be proper to make a few suggestions in regard to the prices at which they can be obtained.

Where those persons to whom I have sold general rights for towns or counties have sold individual rights to make and use them, the uniform price for such individual right is, and has been, about five dollars; for a single hive to use or make by two dollars.

The whole actual expense of making these hives, zinc or metal, glass, lumber, nails, paint, &c., is generally proportional to the number made up; for instance to get every thing and hire a man who is not accustomed to making them, but an ordinarily good workman, to make one or two, the value of his time and the material would cost about \$1 75 each. Where ten are made up *well*, and good lumber can be had for \$2 per hundred feet, they would probably cost \$15. Fifty could be made for \$60, and in larger quantities still cheaper. They should always be well made and painted with a couple of coats of white

lead. The lumber for the cases should be thoroughly seasoned pine; that for the boxes should be about half seasoned, as they will generally swell or shrink a little. When made up in large quantities lumber of proper sizes can be "sawed to a bill" at the saw-mills, and thus a great saving be made in getting out the narrow pieces and rods, as well as in the planing and jointing of the boards, &c. A set of patterns should be cut to work by, so that all pieces for the same purpose shall be uniform. The average amount of lumber used, is about 22 feet in each hive; where lumber is cheap and advantage is taken in cutting it out, they can be made complete, for \$1 each.

The following is a copy of the *claim* granted and allowed to me, and annexed to my Patent, dated May 9th 1846:

"Having thus fully described the manner in which I construct, arrange and use my combined tiers of hives, what I claim as new therein, and desire to secure by Letters Patent, is the manner of arranging the respective tier of boxes, so that the upper one of each tier may be removed, and the two lowermost may be elevated and held in place by means of the sliding rods, for the purpose of introducing an empty hive, beneath and in the manner, and for the purpose set forth. I do not claim the arranging of the boxes in tiers one above the other, and the forming of passages between these boxes, but limit my claim to the particular combination of parts by which this combination is rendered effective, in attaining the proposed end in the manner described.

I likewise claim the forming of a compartment below the hives surrounded entirely by stone or metal, and so arranged as described, as to induce the bee-moth to deposit its eggs in such compartment, where they necessarily perish, and the bees are consequently protected from this formidable enemy."

The following condensed DIRECTIONS may be found useful by those who adopt the hive:

1st. *To hive a swarm of Bees.*—Place a piece of tin or zinc over the holes in the top of the lower or middle box, (according to the size of the swarm allowing them when hived to occupy one or both,) to prevent the bees from going into the box above,—draw out the zinc bottom and hive as in old fashioned hives.

2d. Stand the hive on stone, brick, or zinc, near the ground, which will create moisture sufficient to prevent the bee moth from hatching.

3d. After the bees have gone to work place the zinc bottom through the cleets so as to form an inclined plane for the bees to go in on.

4th. After they have filled the middle box and fairly commenced in the bottom one, draw out the top box, raise the other boxes by the slides, and put the empty box in the vacant space at the bottom.

5th. If the hive should be likely to get full before the bees are done breeding young swarms for the season, take a top box from another hive of the same dimensions, and place the top box with the young swarm in it, *as the middle box of the new hive*; then place an empty box from the new hive into the bottom space of the other, which will enable the old swarm to continue at work. Repeat this as often as young swarms can be spared until about the 1st. of August, after which time, boxes of honey can be taken away from the top and emptied and put in the lower space.

6th. Be careful to leave plenty of honey in the hive through the winter, as what remains can all be taken away in the spring immediately after the bees have commenced work, and the honey can be kept better in the hive than any where else.

7th. In the fall shut up the hive by the zinc plate at the bottom to protect the bees from mice &c. when buried or put in cellars. The sheet of zinc can also be thus used when necessary to remove the hive, or to prevent neighboring swarms from robbing it. When removing boxes of honey, or placing swarms in other hives, the sheet of zinc placed between the drawer to be removed and the one below, the zinc being drawn out with the drawer keeps the bees in it, under entire control.

The following certificates of respectable and *disinterested* gentlemen who have thoroughly tried, and are well acquainted with these hives, are added for the satisfaction of others:

"Having received two bee hives of Wm. R. Kelsey, which were by him prepared, in April last, I caused the bees from two old hives to be transferred to the improved hives by Mr. Kelsey, and thus far the evidence is to me that they are better arranged than any other hives I have used for years past—allowing honey to be taken to the extent of the surplus, beyond the wants of the bees in the hive, and would think the chance for

trouble to the bees from worms, would be much less than in hives I have used heretofore, which have, in many cases, been serious, and in others entirely destroyed. I am also of the opinion that if worms should get into the hive, as improved by Mr. Kelsey, that they could more easily be removed than from other hives that I am acquainted with—which items are of interest to those who keep bees.

L. G. TOWNSEND.

Big Stream Point July 1, 1845."

A singular circumstance happened to the bees of Mr. Townsend last spring: He is a very cautious but enterprising merchant and resides at Big Stream Point, on the west shore of Seneca Lake.—Every spring that stream is much swollen by heavy rains and the melting of the ice formed in the district of country drained by it, and at such times is very turbulent. A few yards from his house the waters of the stream pour over a ledge of rocks perpendicularly, nearly 90 feet. At the time above mentioned Mr. Townsend had bees in several of my hives, besides others in those of different construction, all situated in his door yard, and apparently safe. During the night his garden and premises were overflowed, and all his bees and considerable lumber, &c. were swept off into the lake. About 10 o'clock the next morning some of my hives were picked up by Capt. Dakin, of the Steamboat Richard Stevens, while on her trip up from Geneva, and restored to Mr. T. with the honey and bees in them safe, and as little damaged as though they had not taken their aquatic excursion. They were found nearly three miles from Big Stream Point. The weight of the bottoms had kept the hives erect, and the bees had ascended to the upper part, where they had sufficient air by means of the ventilator.

"I have been extensively engaged in bee culture for many years, both in this State and in New Jersey. I have also seen most of the bee hives that have been patented, and found them of little or no value. The bee hive recently invented by Mr. Wm. R. Kelsey, of Starkey, Yates county, (one of which I have purchased) is the most complete of any that I have yet seen, and from my experience in the management of bees, I

think they are the best that can be found. They are cheap and durable, (essential qualities for farmers) and the easy and safe control that a person has over a swarm in one of those hives, as well as the principles upon which they are regulated, must give them the preference over any others now in use.

MARTIN HOLMES, Sheriff of Yates Co. N. Y.

Barrington, Yates Co., N. Y. July 1, 1845.

I have one of Mr. Kelsey's hives in use, and had others made which I intend using. I think they are the best bee hives in every respect that can be found. I am satisfied that the principle is a correct one. I have had some 35 years experience in the management and culture of bees, and have never found any hive that was as complete as Mr. Kelsey's. Bees certainly do the best in new comb, and I think that Mr. Kelsey's hive is a sure protection to the bees against millers or bee moths. Reading, June 30, 1845.

JAMES ROBERTS.

I certify that on the 13th day of June last., about noon, I hived a swarm of bees in one of Mr. Kelsey's newly invented hives. They immediately went to work, and the two upper hives or drawers, now contain I should judge, between thirty and forty pounds of honey.—It is nice and pure. The bees have commenced work in the lower drawer. The top drawer or hive is entirely full, and the middle one nearly so. I have since hived two others in similar hives, and am satisfied that they are the best kind of hives now in use. I certainly give them the preference over all others.

Reading, Steuben Co., N. Y. June 30, 1845.

JONATHAN E. ABBEY.

I have kept a large number of swarms of bees for many years past, and have several different patent bee hives in use. I have recently hived two swarms in Mr. Kelsey's improved bee hives, which are doing well, and I believe from the construction of the hives, and the experience I have had in the management of bees, that they are decidedly the best that can be found.

ANDREW RAPLEE.

Starkey, July 1, 1845.

I have tried bee hives of different patents, and still have some in use. The bee hives recently invented by Mr. Kelsey, (one of which I have now in use,) I consider superior to any others that I have seen. I recommend them to the public.

July 1, 1845.

COE S. REEDER.

I have one of Kelsey's hives in use, and confidently recommend them to farmers, as superior articles for general use—being cheap, durable, and a protection against the bee moths.

MATTHEW HAIR.

July 1, 1845.

I unite with Mr. Hair in his recommendation. July 1, 1845.

JAMES C. HENDERSON."

From a large number of equally strong and important certificates which I have received from my patrons during the past season, I have selected the three following as being the most concise. The characters of the gentlemen whose names are appended are sufficient evidence of the truth of their statements. Rev. Philander Shedd, (formerly of Truxton, Cortland Co. N. Y., and more recently of Tompkins Co.,) is a talented and distinguished Baptist minister, at present located at Dundee, N. Y.; Rev. Reed Burritt is too well known in Western New York as an Apiarian, and intelligent correspondent of the Agricultural journals to need any introduction from me.

I have kept a large number of swarms of bees for many years past—have tried several different kinds of hives, some of which were patented—have Mr. Kelsey's hives in use, am much pleased with them—think if rightly attended to, the moths are easily prevented by them from doing harm and on every other account are far superior to any other hives.

REED BURRITT,

Pastor Baptist Church, Burdett, N. Y.

From Elder Shedd, Dundee, N. Y.

I have kept bees for a number of years past, and have been confident that very great improvements might be made in those hives that have been in general use, and find all those improve-

ments in Mr. Kelsey's improved Bee Hives, and think they cannot fail of coming into general use as it is perfectly easy to divide the swarms at pleasure and with safety, and they will protect the bees against the ravages of the moth and keep them in an active and healthy state.

PHILANDER SHEDD.

Dundee, June 19, 1846.

From Dr. R. Huse, Dundee, N. Y.

I have used Wm. R. Kelsey's Alternating Bee Hives two seasons under his directions and find them all that they are recommended. They are intended for general stock hives for farmers and bee cultivators, and cannot fail to come into general use immediately wherever introduced. They have been thoroughly tried in this vicinity, and their popularity increases with use. I have tried the dividing principle with perfect success.

RICHARD HUSE.

Dundee, Yates co., N. Y.; June 17, 1846."

The following notice from the Dundee Record of June 30, 1846, was copied and cordially endorsed by the "Syracuse Star," "Penn-Yan Democrat," "Yates Co. Whig," and many other newspapers in N. Y.

KELSEY'S ALTERNATING BEE-HIVES.—We are glad to learn that the valuable Bee Hives invented by our fellow townsman, Wm. R. Kelsey, to which we alluded last season in a general article upon Bees and Insects, were patented to him on the 9th of last month. Every improvement tending to the advantage of the farmer, we deem it our duty to speak of freely; and although we bestowed strong commendation on these hives last year, they fully answered that recommendation, and those persons who then examined and have used them under the direction of Mr. Kelsey have become fully satisfied that they are constructed on correct principles. Most of the extensive bee cultivators in this vicinity have tried and are adopting them. The advantages that they possess over all other hives now in use are so numerous—the protection that they afford against the bee moth, mice and insects so complete—the principle of always keeping the bees in new honey comb, by which they are

kept strong and healthy—the entire control a person has over the bees at all times, and the benefits in dividing swarms which can be done with perfect safety, all combine to render them deservedly popular. In this vicinity where they are best known and have been thoroughly tested, they are found to answer admirably for stock hives, and we have no hesitation in saying that no farmer or other person who wishes to engage in the bee culture should be without them. They must ultimately come into general use, as a good and profitable market can always be found for all good honey that can be raised, and swarms can be multiplied in them with safety, faster than in any other hives; and as it is unnecessary to destroy the bees to obtain the honey, they must be the most profitable ones.”

From the Syracuse Daily Star.

KELSEY'S ALTERNATING BEE HIVE.—We observe, by a notice in another column, that Mr. Kelsey, the Patentee of the above mentioned Hive, is again in town. The success that has attended the use of these hives,—their cheapness, simplicity, usefulness and durability, and the satisfaction they have given wherever they have been used, are convincing proofs that for the purposes of those farmers and other persons who wish to make money by the bee culture, they are now unrivalled. They stand deservedly high, and we are glad to see that the Inventor meets with the reward that his exertions merit,—a proper appreciation of their value.

The following article from the Genesee Farmer, for September, 1846, appears to have been written by a practical bee culturist, and contains some just remarks. I trust that ere this the writer has seen and examined my hives, and satisfied himself upon the subject:

MR. EDITOR: The Bee culture, which has been so long neglected in this as well as most other counties in our State, appears to have received a new impetus from recent discoveries—judging from the attention that the subject is now attracting. Certain it is that if farmers and bee men could be successful in the management of bees for any considerable length of time, there cannot be found any more profitable

branch of rural occupation. But bee men have learned from sad experience, that the old fashioned box hives are better than the "bee houses," expensive "bee palaces," and all the patent hives hitherto in general use (which, by the bye, are no improvements in reality,) put together—provided that the old comb be broken out of them every year or two. This process I am aware, is a dangerous one, not only to the bees, but to the operator; but I am satisfied from long observation, and the experience of bee culturists generally confirms the remark, that bees cannot live and hatch young swarms in the same set of cells for more than one season without each subsequent swarm becoming more feeble or smaller than the previous one, owing to their not having been fully developed in the cells, or part of them not hatching out at all.

These remarks are made because I discover by the papers here that a new hive, called "Kelsey's Alternating Bee-Hive," patented recently, is now offered to the public, which, it is claimed, embraces great advantages over all others now before the public, and to be founded upon entirely new principles, by means of which swarms can be preserved and increased *ad infinitum*.

Now I am one of those who wish to be satisfied before I praise or condemn any thing, and I really wish that some of your subscribers or correspondents who may be acquainted with these hives, or the success that has attended their use wherever it may be, (in Yates county I think the advertisement says,) will inform the farmers of this county, through your columns, of the practical results and management of bees in them, and wherein their principles are entirely new or worthy of attention.

There are so many humbugs and failures in bee-hives now in use, that these hives, if any better, should be adopted, and if not the farmers should not be cheated and induced to buy them. Farmers want no fancy hives;—they want good simple and cheap *stock hives*, such as will be easy of management and control, and will be in some way a preventive to the ravages of the bee-moth. Let us understand what we buy from practical men, who know something in regard to the subject.

Respectfully yours,

Salina, Onondaga Co., July, 1846.

AN APIARIAN.

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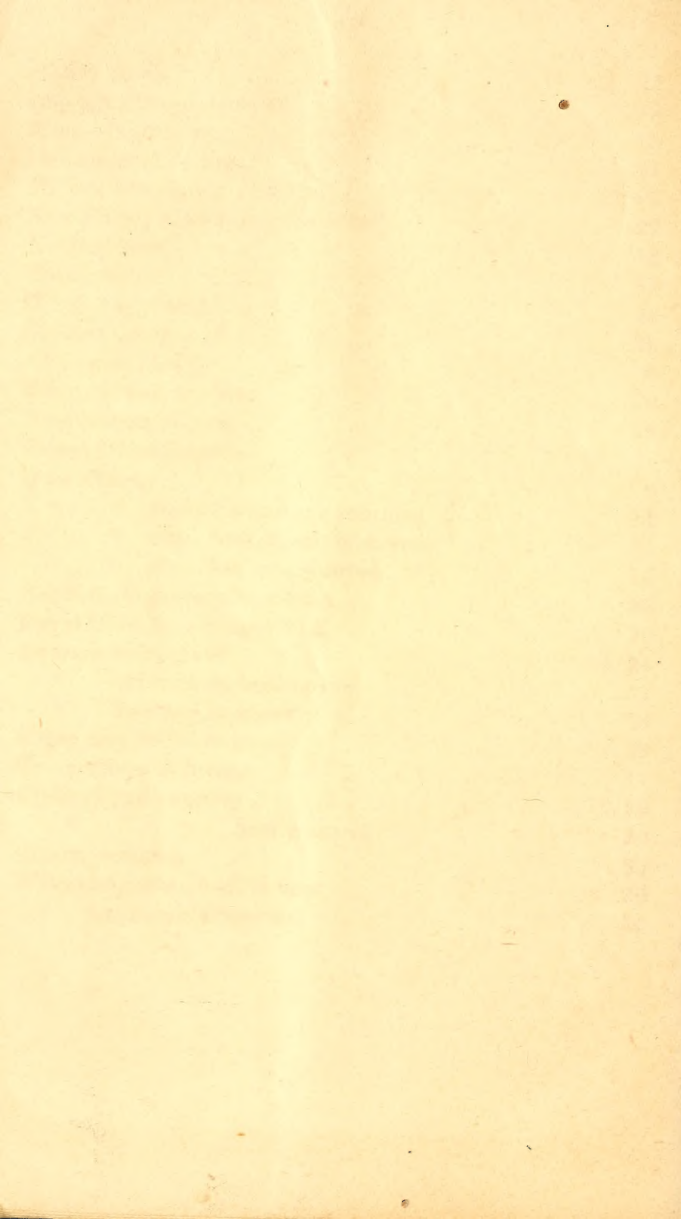




Fig 1

